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OPERATOR'S MANUAL

FIELD STRENGTH METER
MODEL 498A

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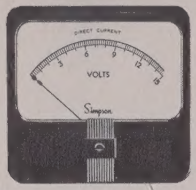

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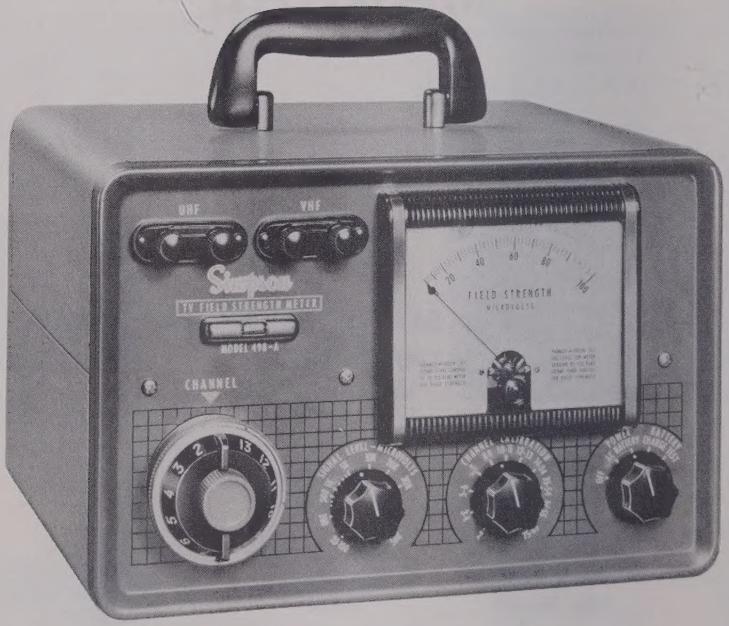

FIGURE 1. SIMPSON FIELD STRENGTH METER MODEL 498-A

SECTION I

GENERAL DESCRIPTION

The Simpson Field Strength Meter Model 498-A is an instrument which was designed to be used to measure the strength of a television signal – either black-and-white or color – available from an antenna. You can tune it to any TV channel, 2 through 83, and determine the effectiveness of the antenna for reception of signals at the tuned frequency. The strength of the signal picked up by the antenna is indicated on a large easy-to-read meter on the front panel.

MAJOR APPLICATIONS

The main use for this field strength meter is to help select an antenna position and orientation which will provide optimum reception. This is much more important for color reception than for black-and-white, but is an influencing factor for all reception quality. Maximum signal strength will usually provide the best results.

The instrument can also be used to compare the effectiveness of various possible antennas, for predicting fringe area installation possibilities, for locating sources of interference, and for many other applications.

SIGNAL SUBSTITUTION FOR TESTING

Since the Simpson Field Strength Meter Model 498-A contains a tuner which produces an intermediate frequency output, in the 40 mc range, you can use the instrument for signal substitution when you check a receiver in which the tuner's

operation is doubtful.. The tested receiver must be one of the later models which also has a 40 megacycle IF. See Section V of this manual for further instructions.

INDICATIONS

The meter indicates video carrier strength, when it is properly tuned, since the strength of the video carrier is usually the most important consideration. Due to the nature of the circuits, it is also possible to obtain a sound output for all channels except 4, 6, and 13. There is a convenient jack in the rear panel into which you can insert a standard 2-conductor phone plug. With a pair of high impedance headphones connected to the plug, you can hear the sound output.

PORTABILITY

The Simpson Field Strength Meter Model 498-A can be completely portable, or can be operated from a 117 volt AC power source. To make it portable, use a 6 volt storage battery in the space provided in the case. It can also be used with the 6 volt electrical system in your truck or automobile. Up to 100 feet of #12 extension cord can be used for the DC input.

SENSITIVITY

The sensitivity of the Simpson Field Strength Meter Model 498-A is variable from 20 microvolts to 50,000 microvolts. Variation of sensitivity is obtained with a potentiometer, which is a front panel control.

The knob rotates past 12 points marked on the panel. These are labelled 20-100, 200, 300, 500, 1K, 2K, 3K, 5K, 10K, 20K, 30K, and 50K. When the sensitivity knob is set at the 20-100 position, the signal is read directly off the meter. When the sensitivity knob is set at any of the remaining positions, full scale meter deflection will be obtained when that number of microvolts is present at the antenna terminals and the instrument is tuned to the signal frequency.

POWER CONSUMPTION

The power consumed by the Model 498-A is approximately 18 watts for a 117 volt AC input. The current drain from a 6 volt storage battery is about 3 amperes.

CASE

The Simpson Field Strength Meter Model 498-A is housed in a grey metal cabinet which measures 11½" long x 7½" high x 9½" deep. The instrument weighs 14¾ pounds (without an internal battery).

FRONT PANEL CONTROLS AND CONNECTIONS

ANTENNA TERMINALS

There are two sets of signal input terminals at the upper left hand corner of the front panel. One of these is for UHF connections, for channels 14 through 83. The other is for VHF connections, for channels 2 through 13.

NEON LAMP

Below the input terminals is a neon lamp which glows when power is applied to the circuits of the instrument. This glows for either a 117 volt AC input or for a 6 volt DC input, and also when the battery is being charged.

CHANNEL SELECTOR

In the lower left hand corner is the channel selector. It has three concentric controls. The inner knob is used for fine tuning the V.H.F. channels. The center knob has 13 positions; one for each V.H.F. channel, and one position is used to set up the tuner for U.H.F. operation. The outer knob is used for tuning the U.H.F. channels, 14 through 83.

SIGNAL LEVEL CONTROL

The next knob to the right, below the meter, is for the sensitivity control of the Model 498-A. It has 12 marked settings which are labelled 20-100, 200, 300, 500, 1K, 2K, 3K, 5K, 10K, 20K, 30K, and 50K. These are the points where you can set the knob to obtain full scale deflection on the meter when the indicated number of microvolts of signal strength is coming in at the antenna terminals and the instrument is tuned to the frequency of the incoming signals. The sensitivity control is continuously variable, and may be set at any point in its rotation which provides satisfactory indications.

CHANNEL CALIBRATION CONTROL

The next knob to the right, below the meter, is for the calibration of the channel used. It has 11 positions; 2, 3-4, 5-6, 7, 8-9, 10-11, 12-13, 14-34, 35-54, 55-74, 75-83. This control must be in the position corresponding with the CHANNEL SELECTOR for correct sensitivity readings.

POWER-BATTERY SWITCH

The switch at the far right hand side below the meter has five positions. The positions are marked OFF, AC, BATTERY, BATTERY CHARGE, and BATTERY TEST. Set it at the OFF position to turn the entire instrument off.

When the power cord is attached to a 117 volt AC power source, you can turn the instrument on for field strenght measurements with this switch in the AC position. When there is an internal vibrator and either an internal battery or an external connection to a 6 volt DC source, you can turn the instrument on with this switch in the BATTERY position. When you wish to charge the battery, connect the power cord to a 117 volt AC power source and set this switch at BATTERY CHARGE. With the switch in the BATTERY TEST position, the battery voltage is shown on the meter. The Model 498-A will operate when battery voltage is between 5 and 8 volts.

INDICATING METER

The meter is a 4½-inch easy-to-read Simpson Instrument, which is both rugged and sensitive. It has a 50 microampere

movement similar to the one used in the famous Simpson Volt-Ohm-Milliammeter Model 260. There are two scales on the meter; one is marked from 0 to 100, and is the scale on which you will read field strength; the other is marked from 5V to 8V, and is the scale on which you will read battery terminal voltage.

REAR PANEL CONNECTIONS

Looking at the rear of the cabinet, there are two power input receptacles, two fuses, two output jacks, and an access door.

ACCESS DOOR

The large door in the rear panel swings open to give you access to the internal battery compartment and to the lead compartment. Store your power leads in this special place inside the rear of the cabinet, and they will always be handy when you need them.

There are holes through the left hand side of the access door through which you can reach the power connections, fuses, and sound output jack, whether the door is opened or closed.

AC POWER INPUT RECEPTACLE

There is an oval shaped opening through the access door at the left hand side of the rear panel. Inside this opening is located the receptacle for 117 volts AC input. Attach the mating line cord connector into this receptacle whenever

FIGURE 2. REAR VIEW OF CABINET,
SIMPSON FIELD STRENGTH METER MODEL 498-A

you wish to connect the instrument to a 117 volt AC source of power.

DC POWER INPUT RECEPTACLE

Directly above the AC receptacle is a polarized DC connection. This is where you will connect an external source of 6 volts DC to the instrument. It will usually be connected to the 6 volt electrical system in your truck or car. It can be used to operate the entire instrument, or to recharge an internal storage battery in the Model 498-A while you are riding between jobs.

The mating plug for this jack is furnished with the instrument; use #12 or larger wire to make up a lead for your method of application. The wider blade is the positive terminal and the narrower blade is the negative terminal.

FUSES

Two fuses are located side-by-side. The left hand fuse is a type 3 AG ½ ampere fuse for the AC circuits. The right hand fuse is a type 3 AG 5 ampere fuse for the DC circuits.

SOUND OUTPUT JACK

Directly above the fuses is a phone jack. When you wish to use the audio output of the Model 498-A, connect a pair of high impedance headphones to this jack with a regular 2-conductor phone plug.

IF OUTPUT JACK

On the right hand side of the rear panel, there is a rectan-

gular jack. This is the connection point for the IF output of the tuner. Use it to connect the IF signal to the input of a 40 megacycle IF strip in a TV receiver when you wish to test the receiver tuner by signal substitution methods.

The mating plug for this application is provided with the instrument. Use as short a piece of coaxial R.F. cable as practical to make the lead.

POWER LEAD

There is an AC power lead furnished with the instrument, and it is packed inside the lead compartment. It has a female plug on one end which will fit into the AC receptacle at the lower left hand corner of the rear panel. On the other end is a standard AC power plug which will fit into an AC convenience outlet. The lead is 6 feet long.

ACCESSORIES

VIBRATOR

To use your Simpson Field Strength Meter Model 498-A with a 6 volt DC power input, either internal or external, you will have to check first if the vibrator is installed inside the instrument. The correct vibrator for this use is a Mallory type 659 (or equal). See Section IV for installation instructions.

BATTERY

If you wish to have a completely portable field strength meter, independant from any outside power connections

while you use it, install a 6 volt storage battery in the compartment in the rear of the case.

The correct battery for this installation is shown in figure 3. It is a Model H-3, manufactured by Amplus Battery Company, Chicago, Illinois. Use #10-32 screws and nuts, which are supplied with the instrument, to connect the two leads in the Model 498-A to the battery terminals; connect the black lead to the negative terminal and the red lead to the positive terminal. The positive terminal of the battery should face the rear access door.

FIGURE 3. 6-VOLT BATTERY FOR INTERNAL INSTALLATION

SECTION II

OPERATING INSTRUCTIONS

WITH 117 VOLT AC POWER INPUT

To use the Simpson Field Strength Meter Model 498-A to measure TV signal strengths with a 117 volt AC power input, proceed as follows:

1. Open the access door through the rear of the cabinet and remove the AC power cord. Close the access door again. Attach the plug into the receptacle inside the lower left hand corner of the access door. Connect the other end of the power cord to a convenient source of 117 volt, 60 cycle AC, single phase power.

2. Set the POWER BATTERY switch in the lower right hand corner of the front panel at AC. Allow time for the instrument to warm up before you make any measurements.

3. Connect the transmission line from the black-and-white or color antenna to the input terminals at the upper left on the front panel. If the instrument is to be used to measure a VHF signal, connect the transmission line to the pair of terminals at the right; if it is to be used for a UHF signal, connect the transmission line to the pair of terminals at the left.

NOTE

The natural impedance for either VHF or UHF terminals is 300 ohms. If you use transmission line with any impedance other than 300 ohms, match it to the terminals as you would for a TV receiver.

4. Set the CHANNEL CALIBRATION switch at the proper position.

5. Tune the CHANNEL SELECTOR for the channel which is to be received and measured.

6. Adjust the SIGNAL LEVEL control to a position which will provide some meter deflection.

7. For VHF, adjust the fine tuning knob for a maximum deflection on the meter. For UHF, adjust the UHF tuning knob for this maximum deflection.

8. If the meter tends to read off scale, turn the SIGNAL LEVEL control clockwise to reduce the sensitivity and bring the pointer back on the meter scale again.

9. After you have tuned the channel selector for a maximum meter indication, adjust the SIGNAL LEVEL control for full scale meter deflection. The control markings indicate microvolts for full scale indications from 100 microvolts to 50,000 microvolts.

10. For signals less than 100 microvolts, the SIGNAL LEVEL control will be set at 20-100 (maximum counterclockwise) and the signal strength read in microvolts on the meter.

NOTE

If you are using the field strength meter for orientation or for antenna placement, proceed through step 8 above, and then move the antenna while you observe the meter indications. Locate the antenna and orient it at the position which provides the greatest meter indication. If you are using the field strength meter to compare the output strengths of two or more antennas or systems, compare the microvolt readings.

PROCEDURE WITH 6 VOLT DC INTERNAL BATTERY

To use the Simpson Field Strength Meter Model 498-A as a completely portable instrument, free from any external leads, first install a storage battery according to instructions in Section IV in this manual. Then proceed as follows:

1. Set the POWER-BATTERY switch at BATTERY. Allow a short time for the instrument to warm up.

2. Turn the POWER-BATTERY switch to BATTERY TEST and observe the meter indication for terminal voltage of the storage battery. The battery will provide satisfactory results if the meter read 5.4 volts or more. If it is less than that amount, recharge the battery before you attempt to use it.

3. Connect the transmission line from the black-and-white or color antenna to the input terminals at the upper left on the front panel. If the instrument is to be used to measure a VHF signal, connect the transmission line to

the pair of terminals at the right; if it is to be used to measure a UHF signal, connect the transmission line to the antenna terminals at the left.

NOTE

The natural impedance for either VHF or UHF terminals is 300 ohms. If you use transmission line with any impedance other than 300 ohms, match it to the terminals as you would for a TV receiver.

4. Set the CHANNEL CALIBRATION switch at the proper position depending on the channel which is to be tested.

5. Tune the channel selector for the channel which is to be received.

6. Adjust the SIGNAL LEVEL control to a position which will provide some meter deflection.

7. For VHF, adjust the fine tuning knob for a maximum meter deflection. For UHF, set the CHANNEL SELECTOR to UHF, and adjust the UHF tuning knob for this maximum deflection.

8. If the meter tends to read off scale, turn the SIGNAL LEVEL control clockwise to reduce the sensitivity and bring the pointer back on the meter scale again.

9. After you have tuned the CHANNEL SELECTOR for a maximum meter indication, adjust the SIGNAL LEVEL control for full scale meter deflection. The panel mark indicates the microvolts for full scale deflection.

10. For sensitivity under 100 microvolts read the meter.

NOTE

If you are using the field strength meter for orientation or for antenna placement, proceed through step 9 above, and then move the antenna while you observe the meter indication. Locate and orient the antenna at the position which provides the greatest meter indication with the maximum signal level setting.

If you are using the field strength meter to compare the output strengths of two or more antennas or systems, compare the meter indications when the signal level control is set in exactly the same position for all readings.

PROCEDURE WITH 6 VOLT DC EXTERNAL POWER SOURCE

For many applications, it is convenient to use the 6 volt electrical system in your truck or automobile for the power input for your field strength meter. Be sure to check and see that your electrical system has 6 volts before you connect the field strength meter to it; many late model cars are now using 12 volt electrical systems.

CAUTION

If you apply 12 volts to the DC power input of your Model 498-A, you will damage the instrument.

There are other sources of 6 volt DC power which may be used. For instance, a separate 6 volt storage battery which is not located inside the instrument case, or a 6 volt DC

generator. Use any of these power sources which are convenient for your applications.

Use the polarized plug furnished with your instrument to make up a connecting lead for your 6 volt DC power source. Use the wider contact for connection to the positive polarity of the power source, and the narrower contact for negative polarity. Use heavy enough lead wire to carry the current, which is about 3 amperes.

As an example, you can connect the output of your 6 volt electrical system in your car or truck through an extension cord as long as 100 feet if it is made with #12 wires. This assumes that you will keep your engine running fast enough so the ammeter does not show discharge while you use the instrument, in order to use the generator voltage which is about 7 volts. Shorter lengths of extension cord or larger wire sizes are required when you are using the battery.

Connect the polarized plug into the receptacle on the rear of the instrument. See figure 2 for the location of this receptacle.

NOTE

If you connect DC power from your truck or car to the Model 498-A, check to see which polarity is grounded in the vehicle. If there is a negative ground, do not allow the metal case of the Model 498-A to contact any metal in the vehicle or you will short out the vehicle's electrical system.

After you have connected 6 volts DC through the polarized plug and receptacle, proceed as for internal battery. See instructions under heading "PROCEDURE WITH 6 VOLT INTERNAL BATTERY."

BATTERY CHARGING

When you have a battery inside the case of your Model 498-A you will need to recharge it periodically. Whenever the meter indicates that the battery is getting low, as shown on the battery test circuit, recharge it.

There are two methods for recharging your internal battery. One uses a 117 volt AC power input. The second uses the DC charging circuit of your truck or automobile, providing it has a 6 volt system.

BATTERY CHARGING WITH 117 VOLTS AC

Connect the power cord into the receptacle in the lower left hand corner in the rear of your Model 498-A. Connect the other end of the power cord to a 117 volt AC power outlet Set the POWER BATTERY switch, in the lower right hand corner of the front panel, at BATTERY CHARGE position. The power transformer will step down the voltage and this will be rectified and applied across the battery to charge it.

It takes about 12 to 18 hours to charge the battery which was discharged to 5.4 volts.

CHARGING FROM A DC SOURCE

To charge the battery inside the case of your Model 498-A from a DC source, such as the output from your 6 volt electrical system in your truck or car, connect a power cord to the polarized plug and receptacle through the rear of the cabinet. Then connect this cord to the electrical system. You can use the cigarette lighter for connections. Set the POWER BATTERY switch for the Model 498-A at OFF while you charge the internal battery from a DC source.

NOTE

Be sure to observe polarity for the connection. Connect the positive polarity from the power source to ground in the Model 498-A through the wider contact in the polarized plug.

Do not allow the instrument case to contact any metal in the vehicle, if the vehicle's electrical system has a negative ground.

Keep the engine running while you charge the battery.

Turn the function switch to BATTERY TEST from time to time during the charging procedure to see how the voltage is increasing in your battery.

The rate of current is not constant. It varies from a fraction of an ampere to about 2 amperes, depending on the speed of the engine and the relative charged condition of the battery.

The total time which would be required for fully charging a discharged internal battery with this method could be from 10 to 12 hours, and you will probably only use this method to restore its use temporarily when you are isolated from a more efficient charging source.

SECTION III

THEORY OF OPERATION

The circuits which are used to make the Simpson Field Strength Meter Model 498-A operate are similar to those in a television receiver. They are shown, in block form, in figure 4. The signal from a transmitter is received through an antenna and applied at the antenna input terminals. It is then selected and converted to a nominal 40 megacycle intermediate frequency in the tuner. The IF is then amplified through two stages to reach a satisfactory strength for detection and application to the meter circuit.

IF AMPLIFIERS

The two IF amplifiers are peak tuned, rather than being tuned for broad band response as they would be in a television receiver. This is true because the strength indication on the meter is to be carrier strength; modulation is not important, so broad band response is not desirable.

CONSTANT AMPLIFICATION FACTOR

The voltage output from the detector is proportional to the carrier strength of the tuned channel. The SIGNAL LEVEL control allows the operator to select a level of gain in the unit which will provide satisfactory meter deflection for any usable signal strength at the antenna.

IF OUTPUT

For convenience, there is an IF output connection built into the rear panel of the field strength meter. It may be used for signal substitution in receivers where the intermediate frequency is 40 megacycles. The signal is taken from the cathode circuit of the first IF amplifiers, and its band width at this point is still broad, the same as it would be in the receiver under test.

AUDIO OUTPUT

There is also a phone jack, located in the rear panel, into which you can connect a 2-conductor phone plug and a pair of earphones. There are two ways in which you can use this sound output. One is to hear the sound modulation on the carrier, and the second is to hear the 60 cycle buzz which identifies the vertical synchronization signal on the video carrier.

To hear sound modulation, set the tuner to receive the next higher channel than the one for which you are measuring field strength. Rotate the fine tuning control and listen for a sound output. Because the video carrier frequency of the

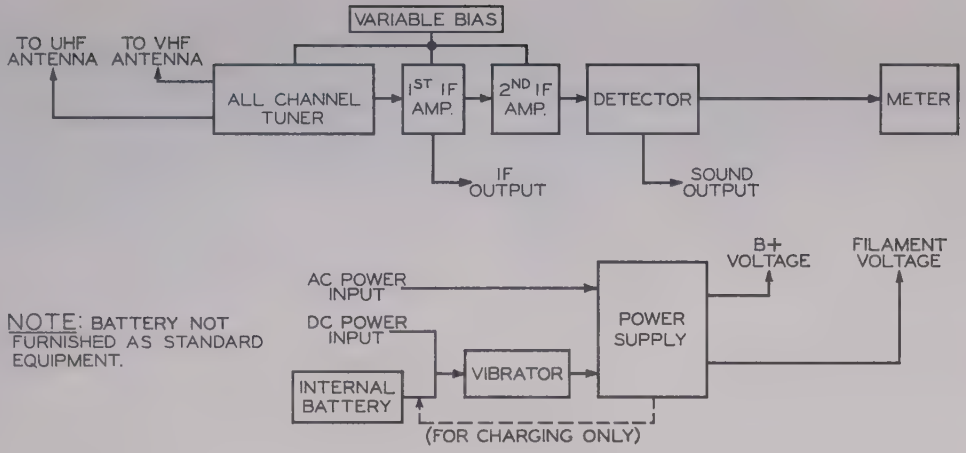

FIGURE 4. BLOCK DIAGRAM OF SIMPSON FIELD STRENGTH METER MODEL 498-A

next higher channel is near the sound carrier frequency of the channel in which you are interested, you can tune close enough to the sound carrier to bring it into the slope area of the peaked IF response.

The detector will demodulate the FM sound and it will be heard in the headphones. Do not expect receiver quality from this sound, since the method of detection is not a normal FM demodulation. It is included as a convenience only.

NOTE

To hear a sound output, the next higher channel must have a frequency band adjacent to that of the tuned channel. There is no provision for channels 4, 6, or 13.

LISTEN TO SYNC BUZZ

When you have tuned the video signal for normal operation and metered indications, there will be a characteristic 60 cycle buzz which you can hear in earphones connected to the sound output. This is due to the vertical synchronizing pulses in the incoming signal. Use it to identify the fact that a transmitted signal is causing the meter deflection, rather than a signal from some interference. This is especially valuable when you suspect interference.

POWER SUPPLY

The lower section of figure 4 shows a block diagram of the power supply for the Model 498-A. Either 117 volts of AC

power or 6 volts of DC power will cause the power supply to furnish operating voltages for the rest of the circuits in the instrument.

The dotted line leading from the power supply back to the DC power source indicates how a charging circuit is set up to recharge an internal battery. When the power switch is set at CHARGE, this circuit is connected but no B+ or filament voltages are applied in the instrument.

SECTION IV

MAINTENANCE

OPENING THE CASE

To obtain access to the chassis inside the case of the Field Strength Meter, remove the four screws on the back which hold the front panel and chassis to the instrument case. Pull forward on the front panel; the chassis is attached and will come out with it.

BATTERY LEADS

To remove the chassis completely from the case, feed the red and black battery leads through the grommet in the wall of the battery compartment. They are attached to the power supply chassis and will come out with it.

When you place the chassis back into the case, be sure to feed the battery leads back through the grommet into the battery compartment again.

INTERNAL 6 VOLT STORAGE BATTERY INSTALLATION

The correct 6 volt storage battery for installation inside the case of the Model 498-A is shown in figure 3. Amplus Battery Company, Chicago, Illinois, Model H-3, is one brand which is satisfactory. It measures 4-1/8 x 3½ x 5½ inches and weighs 6 lbs, 15 oz.

The battery is furnished with two terminal lugs. They are marked + and –, and require screws and nuts, which are supplied, for attaching the battery leads from the Model 498-A. Attach the red lead to the + (positive) terminal and the black lead to the – (negative) terminal.

The battery leads inside the case of the Model 498-A are long enough that you can pull them out through the access door and fasten them to the battery. Then fold them carefully back into the battery compartment as you move the battery into place.

NOTE

When you have a battery in place in your Model 498-A, always carry and use the instrument in a horizontal position. Do not tip the instrument into a vertical position; the battery, although rated spillproof, can allow drops of acid to leak out through the vent holes in the caps. Acid will attack and corrode the inside of the battery compartment and the leads and insulation.

BATTERY MAINTENANCE

As a storage battery is used, the chemical changes inside it increase its internal resistance and reduce its terminal voltage under load. A fully charged battery should be able to furnish enough power for a full day's work. The battery will operate for 10 to 15 periods of 12 to 15 minutes duration before it is discharged far enough to interfere with further operation.

Check the terminal voltage under load by turning the function switch to BATTERY TEST. This terminal voltage indicates the battery condition. When the terminal voltage gets down to 5.4 volts, recharge the battery before you use it any more.

ELECTROLYTE

The storage battery uses sulfuric acid electrolyte, which is standard for lead-acid storage cells. This is composed of sulfuric acid and distilled water. It is mixed so the original specific gravity is 1.300. During use, the specific gravity decreases. Then during charging, it increases again. It is normal for the maximum specific gravity after recharging to be about 1.275 rather than 1.300. A specific gravity of about 1.175 indicates a low state of charge.

The liquid level of the electrolyte will vary over a period of time. Natural evaporation of the water, aided by heat produced in the battery while it is used, is responsible. Add distilled water only whenever the liquid level is less than

1/8 inch above the plates in each cell. Never add acid or tap water.

CAUTION

Adding more liquid than ¼ inch above the plates may cause spilling during charging.

CHARGING WITH 117 VOLTS AC

The built-in charging circuit in the Model 498-A will apply a charging voltage to the internal battery when the instrument is connected to 117 volts AC. Set the POWER-BATTERY switch at BATTERY CHARGE, and connect the AC lead from the receptacle at the rear of the instrument to a 117 volt AC power source.

After you have used the Field Strength Meter as a portable instrument through the day, or at any time when your battery shows that it needs to be recharged, connect it for the AC charging circuit over night. The starting rate of current for charging will be about 0.7 ampere for a discharged battery. This will come down to about 0.5 ampere as the battery becomes charged.

CHARGING FROM AN AUTOMOTIVE CIRCUIT

If you need to recharge your battery while you are driving from one job to another during the day, or at any other time when it is convenient to do so, you can connect it to the 6 volt electrical system in your truck or car.

NOTE

Do not connect the Model 498-A to a 12 volt electrical system such as is found in some late model passenger automobiles. This will damage the instrument.

Use the polarized plug which is furnished with your Model 498-A, and make up a lead to connect the instrument to your electrical system. A convenient outlet for this connection is the cigarette lighter on the dashboard. Connect the positive polarity from the electrical system to the wider contact in the plug, and the negative polarity to the narrower contact. If the truck or car has a negative ground for its electrical system, be sure to insulate the instrument from any metal in the vehicle. The Model 498-A has a positive ground.

Set the power switch, in the lower right hand corner of the front panel, at OFF and connect the lead to the electrical system. Charge the battery only when the engine is running (that is, while driving from job to job). Operate the engine so the ammeter in the car or truck shows that the generator is charging the battery. If the ammeter shows discharge, you are probably drawing current from the battery in the Model 498-A rather than charging it.

When you have a DC charging circuit set up, and you turn the function switch of the Model 498-A to BATTERY TEST, the meter will indicate the voltage in the charging circuit rather than battery voltage. This voltage will be at the beginning of charging approximately 6 to 6.5 volts, and about

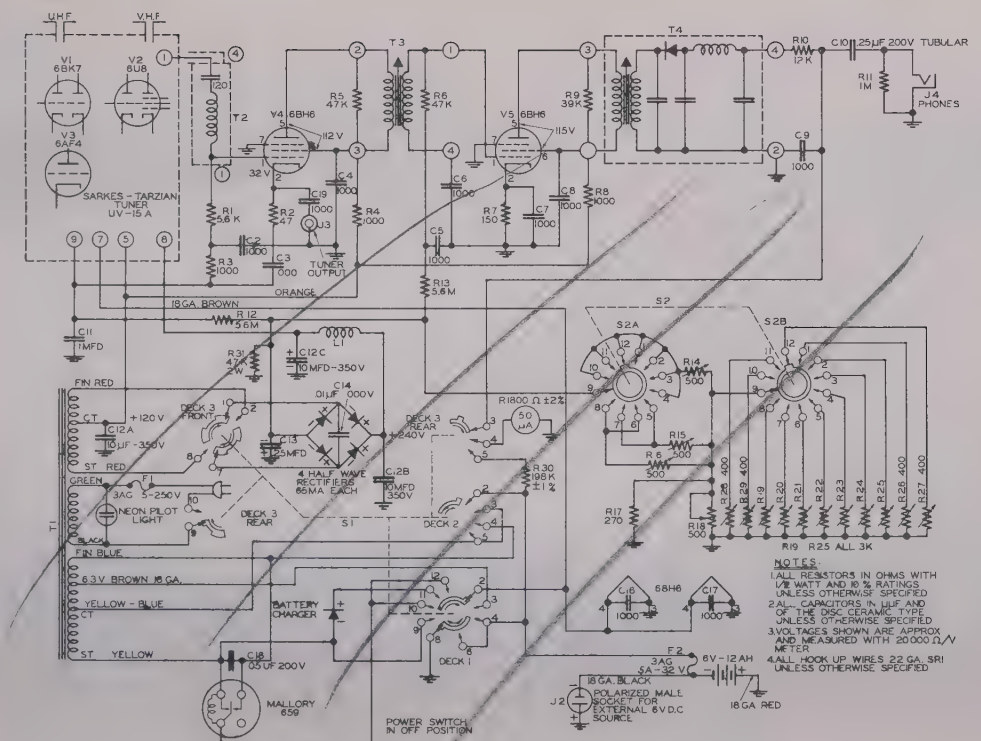

FIGURE 5. OVERALL SCHEMATIC DIAGRAM, SIMPSON FIELD STRENGTH METER MODEL 498-A

7.8 volts at the end of charging, while the charging current is flowing through the battery.

PARTS AND REPLACEMENT

All the resistors and other component parts of the Model 498-A have been selected and engineered to withstand more than the power which they should have to dissipate under normal conditions. But there are conditions under which parts may become damaged or defective and need replacement.

Consult the schematic diagram, figure 6, to help identify the suspected part. If the meter movement is defective, do not attempt to repair it. Any repair on this delicate movement must be made by trained repairmen with the proper tools. Return the instrument to your nearest official Simpson Repair Station, or return it to the repair department at the factory.

Whenever you send in an instrument for repair, write a letter to explain what is wrong with it. Indicate whether you want an estimate on the repairs first, or if you wish to have the repair department proceed on it. This information will speed the repair job and reduce your expense.

PARTS LIST

SYMBOL	DESCRIPTION	SIMPSON PART NO.
C2	Capacitor, fixed, ceramic, 1000 μμf	1-115462
C3	Capacitor, fixed, ceramic, 1000 μμf	1-115462
C4	Capacitor, fixed, ceramic, 1000 μμf	1-115462
C5	Capacitor, fixed, ceramic, 1000 μμf	1-115462
C6	Capacitor, fixed, ceramic, 1000 μμf	1-115462
C7	Capacitor, fixed, ceramic, 1000 μμf	1-115462
C8	Capacitor, fixed, ceramic, 1000 μμf	1-115462
C9	Capacitor, fixed, ceramic, 1000 μμf	1-115462
C10	Capacitor, fixed, paper, 0.25 μf 200 v	1-114718
C11	Capacitor, fixed, paper, 0.1 μf 400 v	1-113901
C12 A-B-C	Capacitor, Electrolytic, 10-10-10 μf 350 v	1-117262
C13	Capacitor, Electrolytic, 25 μf 25 v	1-117263
C14	Capacitor, fixed, paper, 0.01 μf 1000 v	1-115895
C16	Capacitor, fixed, ceramic, 1000 μμf	1-115462
C17	Capacitor, fixed, ceramic, 1000 μμf	1-115462
C18	Capacitor, fixed, paper, 0.05 μf 200 v	1-115459
C19	Capacitor, fixed, ceramic, 1000 μμf	1-115462
F1	Fuse, 0.5 amp, 250 v, 3 AG	1-115595
F2	Fuse, 5 amp, 32 v, 3 AG	1-115594
I1	Neon lamp	1-115601
J1	Receptacle, male, for AC input	1-115597
J2	Receptacle, male, for DC input	1-115649
J3	Connector, for IF output	1-116045

Parts List

SYMBOL	DESCRIPTION	SIMPSON PART NO.
J4	Phone jack for sound output	1-116045
M1	Meter, 50 μ-amp	15-AC2398
R1	Resistor, 5.6 K ohms, ½ watt, 10%	1-114465
R2	Resistor, 47 ohms, ½ watt, 10%	1-113921
R3	Resistor, 1000 ohms, ½ watt, 10%	1-111689
R4	Resistor, 1000 ohms, ½ watt, 10%	1-111689
R5	Resistor, 47 K ohms, ½ watt, 10%	1-114881
R6	Resistor, 47 K ohms, ½ watt, 10%	1-114881
R7	Resistor, 150 ohms, ½ watt, 10%	1-113926
R8	Resistor, 1000 ohms, ½ watt, 10%	1-111689
R9	Resistor, 39 K ohms, ½ watt, 10%	1-115613
R10	Resistor, 12 K ohms, ½ watt, 10%	1-115655
R11	Resistor, 1 megohm, ½ watt, 10%	1-113952
R12	Resistor, 5.6 megohms, ½ watt, 10%	1-114684
R13	Resistor, 5.6 megohms, ½ watt, 10%	1-114684
R14	Potentiometer, 500 ohms	1-114181
R15	Potentiometer, 500 ohms	1-114181
R16	Potentiometer, 500 ohms	1-114181
R17	Resistor, 270 ohms, ½ watt, 10%	1-115386
R18	Potentiometer, 500 ohms	1-117425
R19	Rheostat, 3 K ohms, 10%	1-115768
R20	Rheostat, 3 K ohms, 10%	1-115768
R21	Rheostat, 3 K ohms, 10%	1-115768
R22	Rheostat, 3 K ohms, 10%	1-115768
R23	Rheostat, 3 K ohms, 10%	1-115768
R24	Rheostat, 3 K ohms, 10%	1-115768
R25	Rheostat, 3 K ohms, 10%	1-115768
R26	Rheostat, 1 K ohms, 10%	1-117656

Parts List

SYMBOL	DESCRIPTION	SIMPSON PART NO.
R27	Rheostat, 1 K ohms, 10%	1-117656
R28	Rheostat, 1 K ohms, 10%	1-117656
R29	Rheostat, 1 K ohms, 10%	1-117656
R30	Resistor, 198 K ohms, ½ watt, 1%	1-115116
R31	Resistor, 47 K ohms, 2 watt, 10%	1-116577
T1	Power transformer	1-115577
T2	Transformer, IF input	1-116887
T3	Transformer, IF interstage	1-116888
T4	Transformer, IF output (with IN64 crystal)	1-115603
L1	Filter choke, 4 henries	1-115455
V1	Tube, type 6BK7	
V2	Tube, type 6U8	
V3	Tube, type 6AF4	
V4	Tube, type 6BH4	
V5	Tube, type 6BH4	
	Selenium Rectifier, 65 ma	1-115592
	Selenium Rectifier, battery charge, 0.36 amp	1-115593
	Knob, POWER Switch or SIGNAL LEVEL Control	1-115548
	Knob, U.H.F. Indicator	1-116886
	Knob, U.H.F. Selector	1-116885
	Knob, V.H.F. Selector	1-116884
	Knob, V.H.F. Fine Tuning	1-116883
	Case assembly	10-890207
	Handle with posts	1-114024
	D.C. polarized plug	1-115607
	Vibrator	1-115598

SECTION V

SPECIAL USES

IF SIGNAL SUBSTITUTION

The front end section in the Simpson Field Strength Meter Model 498-A is the same as in many commercial TV receivers. There is a pair of antenna terminals to which you will connect the lead-in-wire from whatever antenna you are using. The signal passes from these terminals through a tuner section, and the modulation is transferred from the original carrier frequencies to the intermediate frequency carriers. The nominal IF for the tuner which is used in the instrument is in the 40 mc range. Actually, the video carrier is 45.75 mc, and the sound carrier is 41.25 mc.

For normal use, when video carrier strength is to be read on the meter, the IF amplifiers in the instrument will amplify the 45.75 mc signal and disregard the rest of the band of tuned frequencies. This happens because the IF transformers are peak tuned at 45.75 mc. However, the entire spectrum of frequencies for the transmitted channel is included in the output of the tuner section.

Occasionally, in your service work, you will suspect that a TV receiver has a defective tuner section. For your convenience in such cases, the IF output of the tuner in the Model 498-A is available to use as a substitute signal. Transfer it to the input of the IF section in the receiver and compare reception qualities. Of course, the receiver IF

must be of the 40 megacycle range.

The cathode circuit of the first IF amplifier in the Field Strength Meter has been set up to function as a cathode follower. The cathode resistance is 47 ohms. Connector J3 is connected across this resistance. The signal strength at this connector on the rear panel is very nearly the same as the signal voltage coming from the tuner.

Connect a piece of 50 ohm coaxial transmission line from the connector to the IF input of the receiver which you wish to test. Disconnect the lead from the receiver tuner to its IF strip. Connect the center lead of the coaxial line to the lead and the shield to the receiver ground.

Turn on the receiver and the Model 498-A. Tune the Model 498-A and observe the picture and sound in the receiver. If they are improved over their qualities when using the receiver tuner, this proves that the receiver tuner is not operating properly. If the qualities are not improved, the fault probably lies in some other part of the receiver.

SIMPSON WARRANTY REPAIR STATIONS AND PARTS DEPOTS

**ARIZONA, PHOENIX
Metercraft, Inc.
3304 N. 24th Street
States: Arizona
Phone: CRestwood 9-5287

CALIFORNIA, LOS ANGELES
Quality Electric Company
3700 South Broadway
States: Southern California below Fresno and Arizona
Phone: ADams 2-4201

CALIFORNIA, SAN FRANCISCO
Pacific Electrical Instrument Lab.
111 Main Street
States: Northern California above Fresno and Nevada
Phone: GArfield 1-7185

**CANADA
Bach-Simpson Ltd.
1255 Brydges Street, P.O. Box 484, London, Ontario, Canada
Phone: GLadstone 1-9490

COLORADO, DENVER
Meter-Master Instrument Service
2379 S. Downing Street
States: Wyoming, Utah, Colorado, and New Mexico
Phone: RAce 2-8670

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**Repair Stations only; no resale of parts.
(All other stations repair instruments and sell repair parts)

CONNECTICUT, NEW HAVEN
Kaufman Instrument Labs, Inc.
810 Dixwell Avenue
States: Connecticut
Phone: SPruce 6-7201

FLORIDA, ORLANDO
Electro Tech Corp.
307 - 27th Street
States: Florida
Phone: GArden 3-5589

GEORGIA, ATLANTA
Electro-Tech Equipment
690 Murphy Ave., S.W.
States: Alabama, Georgia, Carolina and Tennessee
Phone: PLaza 3-4128

**ILLINOIS, CHICAGO
Simpson Electric Company
5200 W. Kinzie Street
Phone: EStebrook 9-1121

*ILLINOIS, CHICAGO
Pacific Indicator Company
5217 W. Madison Street
States: Chicago, Wisconsin and Indiana
Phone: COlumbus 1-1330

**KANSAS, KANSAS CITY
Sturtz Instrument Co.
4705 Mission Road
States: Kansas
Phone: STarline 1-4711

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LOUISIANA, NEW ORLEANS
Industrial Instrument Works
3328 Magazine Street
States: Arkansas, Mississippi and Louisiana
Phone: TWinbrook 5-5621

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Alvin C. Mancib Company
363 Walden Street
States: Vermont, New Hampshire, Massachusetts, Rhode Island and Maine
Phone: UNiversity 4-2494

MICHIGAN, DETROIT
Ram Meter, Inc.
1100 Hilton Road, Ferndale
States: Michigan
Phone: LIncoln 7-1000

MINNESOTA, MINNEAPOLIS
Instrumentation Services
917 Plymouth Avenue
States: Minnesota, North and South Dakota
Phone: KEllogg 7-5411

MISSOURI, ST. LOUIS
Scherrer Instruments
5449 Delmar Blvd.
States: Illinois below Peoria, Iowa, Missouri
Phone: FOrest 7-9800

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NEW YORK, BUFFALO
Electrical Instrument Labs
932 Hertel Avenue
States: New York State except Metropolitan New York
Phone: EXport 2-2726

NEW YORK, NEW YORK 7
Simpson Instrument Service Corporation
27 Park Place
States: Metropolitan New York and New Jersey above Trenton
Phone: BArclay 7-4977

**NEW YORK, SYRACUSE
Syracuse Instrument Lab
4895 South Avenue, Box 96
Phone: HYatt 2-1651

OHIO, CLEVELAND
Weschler Electric Company
4250 W. 130th Street
States: Ohio and Kentucky
Phone: CLearwater 1-4609

**OKLAHOMA, TULSA
Tri-State Instrument Lab
2216 N. Sheridan Road
States: Oklahoma
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Industrial Instrument Repair Lab.
1910 N. Killingsworth St.
States: Oregon
Phone: BElmont 4-6683

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1810 Grant Avenue
States: Pennsylvania, Maryland, New Jersey below Trenton, Delaware
Phone: ORchard 3-5600

TEXAS, DALLAS
Nelson Electronic Engineering Co., Inc.
6329 Gaston Avenue
States: Texas
Phone: TAylor 4-2626

**TEXAS, HOUSTON
Nelson Electronic Engineering Co., Inc.
3615 Gulf Freeway
Phone: CApitol 8-2835

VIRGINIA, FALLS CHURCH
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States: Washington, D.C., West Virginia, Virginia
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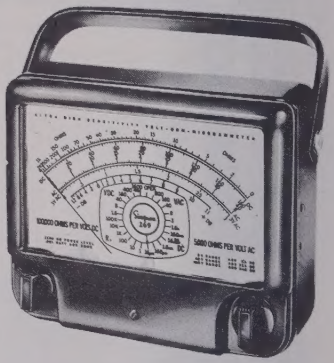

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PART NO.
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SIMPSON ELECTRIC COMPANY warrants each instrument and other articles of equipment manufactured by it to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory any instrument or other article of equipment which shall within 90 days after delivery of such instrument or other article of equipment to the original purchaser be returned intact to it, or to one of its authorized service stations, with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and SIMPSON ELECTRIC COMPANY neither assumes nor authorizes any other persons to assume for it any other liability in connection with the sale of its products.

This warranty shall not apply to any instrument or other article of equipment which shall have been repaired or altered outside the SIMPSON ELECTRIC COMPANY factory or authorized service stations, nor which has been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by the manufacturer.

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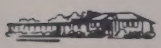

LAC DU FLAMBEAU PLANT
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LAKE STREET PLANT
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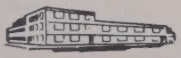

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